

von BOKAY (J.)

REPORT OF INTUBATIONS
PERFORMED IN THE DIPH-
THERIA WARD OF THE
STEFANIE - KINDERSPITAL,
BUDAPEST. (Total 291 Cases.)

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Director of the Stefanie-Kinderspital, Budapest.

Translated from the German with the special
sanction of the author, by

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Surgeon to the Massachusetts Charitable Eye and
Ear Infirmary; Aural Surgeon to the Long
Island Hospital; Inspector Boston
Polyclinic; Fellow of the
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REPORT OF INTUBATIONS PERFORMED IN THE DIPHTHERIA WARD OF THE STEFANIE-KIN- DERSPITAL, BUDAPEST. (Total 291 Cases.)

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O'Dwyer's intubation was performed for the first time, in the diphtheria ward of the Stefanie-Kinderhospital, which is under my charge, in August, 1890. During the following five months, intubation was employed alternately with tracheotomy, but from January 1, 1891, to the present day, every stenotic patient, if an operation seemed to be indicated, was subjected to intubation exclusively. A primary tracheotomy was not performed at all during the last 20 months. The space of time in which we have performed intubations embraces, therefore, 25 and 20 months, respectively, and 291 cases without selection. I wish to state that a premature intubation was not done in a single case, and that we were frequently in a position to observe the recovery of the milder forms of stenosis without operative interference. On the other hand, I considered an operation contra-indicated, when severe septic symptoms were already present, or where the extension of the fibrinous exudate to the bronchioles could be taken for granted.

Of the 291 cases, 100, that is, 34 per cent, made recoveries; of these, laryngitis crouposa developed in 279 cases in the course of faacial diphtheria or without the latter, while in 12 cases, secondary laryngitis crouposa appeared after measles or scarlet fever.

Of the 279 cases belonging to the first group, laryngitis crou-

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posa was observed in 212 cases, either accompanying faucial diphtheria or developing during its course, while in 67 cases appeared the clinical picture of croup without preceding diphtheritic faucial symptoms, in fact, without the presence of the latter.

Of the 212 croup cases which appeared in connection with faucial diphtheria, 65 in all (30.5 per cent) made recoveries.

The summary of these cases according to age is as follows:

From 0-1 year,	9 cases,	(1 case cured).
" 1-2 years,	63 "	(11 cases ").
" 2-3 "	51 "	(20 " ").
" 3-4 "	44 "	(13 " ").
" 4-5 "	21 "	(10 " ").
" 5-6 "	10 "	(5 " ").
" 6-7 "	6 "	(2 " ").
" 7-8 "	3 "	(0 " ").
" 8-9 "	2 "	(1 case ").
" 9-10 "	1 case,	(1 " ").
" 10-11 "	2 cases,	(1 case ").
Total,	212 cases,	(65 cases cured).

Of the 65 cured cases, croup membranes were expelled 17 times, as follows:

- Once by a 10-months-old child..
- Once by a 1½-year-old child.
- Once by a 2-year-old child.
- Five times by a 3-year-old child.
- Once by a 3½-year-old child.
- Three times by a 4½-year-old child.
- Twice by a 5-year-old child.
- Once by a 6-year-old child.
- Once by a 9-year-old child.
- Once by a 12-year-old child.

Secondary tracheotomy was performed eight times, with success, however, only once, and that in the case of a child 4½ years of age.*

Of the 67 cases of laryngitis crouposa not accompanied by faucial diphtheria, 32 (47.5 per cent) recovered; according to age they rank as follows:

From 0-1 year,	8 cases,	(cure in 1 case).
" 1-2 years,	20 "	(" " 5 cases).
" 2-3 "	13 "	(" " 6 ").
" 3-4 "	15 "	(" " 12 ").
" 4-5 "	5 "	(" " 4 ").
" 5-6 "	2 "	(" " 1 case).
" 6-7 "	1 case,	(" " 1 ").
" 7-8 "	3 cases,	(" " 2 cases).
Total	67 cases,	(cure in 32 cases).

Of the 32 cured cases, croup membranes were ejected 9 times, as follows:

- Twice by 2-year-old children.
- Three times by 3-year-old children.
- Once by 3½-year-old children.
- Twice by 4-year-old children.
- Once by 5-year-old children.

Secondary tracheotomy was done in 3 cases, one of which, a child + 3½ years old, made a recovery.

Of those 12 croup cases, which appeared secondary, as the sequel of measles or scarlet fever, 3 (25 per cent) recovered. Croup, as the result of measles, appeared 9 times (1 cure), as the result of scarlet fever 3 times (2 cures).

These cases are grouped according to age, as follows:

From 0-1 year,	1 case,	(no cure).
" 1-2 years,	3 cases,	(1 ").
" 3-4 "	5 "	(1 ").
" 4-5 "	1 case,	(no ").
" 5-6 "	1 "	(no ").
" 9-10 "	1 "	(1 ").
Total,	12 cases,	(3 cures).

*For the first four days, intubation was attended by success. On the fifth day the stenosis of the upper air passages could not be overcome and we were obliged to resort to tracheotomy.

†Intubation was successful for two days. On the third day, the stenosis of the upper air passages could not be overcome by the use of the tube. On that account tracheotomy seemed to be urgently indicated.

In the 100 cases which were cured out of the total number, the space of time during which the tube was retained is as follows:

$\frac{1}{4}$, $1\frac{1}{2}$, 2, 6, $6\frac{1}{2}$, 10 (in 3 cases), 11, $17\frac{1}{2}$, 18, 20 (in 2 cases), 21 (in 2 cases), 22, 24, $24\frac{1}{2}$, 26 (in 2 cases), 27, $28\frac{1}{2}$, 30, 35, 36 (in 6 cases), 39, 41 (in 2 cases), 43 (in 2 cases), 44 (in 2 cases), 45 (in 2 cases), 46, 47, 48 (in 4 cases), 50, 51 (in 3 cases), 52 (in 2 cases), $53\frac{1}{2}$, 55, 56, 58 (in 2 cases), $58\frac{1}{2}$, 59, 60, $60\frac{1}{2}$, $63\frac{1}{2}$, $64\frac{1}{2}$, 65, 67, $67\frac{1}{2}$, 68, $68\frac{1}{2}$ (in 2 cases), $69\frac{1}{2}$ (in 2 cases), $75\frac{1}{2}$, 76, 77, 78, 85, 86, 87, 93, 94, 95, 96 (in 2 cases), 101, 107, $121\frac{1}{2}$, 129 (in 2 cases), 130, 133, 134, 136, 142, $143\frac{1}{2}$, 145, 153, 154, 184, 227, 243, 360 hours.

The minimum time, therefore, amounted to $\frac{1}{4}^*$, $1\frac{1}{2}$, 6, $6\frac{1}{2}$ and 10 hours. The maximum amounted to 184, 227, 243 and 360 hours. The tube was retained in 16 cured cases longer than 5 times 24 hours. This circumstance, to which I called special attention in my report read at Hallé, quite effectually refutes the general validity of that assertion of Escherich, according to which, if final removal of the tube does not take place on the 5th day, secondary tracheotomy should be resorted to, for the avoidance of severe decubitus.

The number of intubations in our cured cases varied, as follows:

In	35	cases	the patient	was intubated	once.
"	27	"	"	"	"
"	18	"	"	"	"
"	7	"	"	"	"
"	4	"	"	"	"
"	6	"	"	"	"
"	2	"	"	"	"
"	1	"	"	"	"
Total,	100	cases.			

I wish to remark that at first the tube was removed as a matter of trial, at the end of the first 24 hours, while later the first extubation under normal conditions took place at the expiration of 48 hours.

Intubation has caused me no difficulty worthy of mention, but several times I have met with obstacles in the use of tubes recently procured from the firm of Ermold of New York. This was

*This case of diphtheritic croup, which is especially instructive on account of the results achieved by intubation, I shall discuss in detail further on.

caused, probably, by the bulging extremity.* Generally, I used tubes furnished by Windler of Berlin, by Jetter and Scheerer of Tuttlingen and Tiemann of New York. The latter had a straight extremity.

A pushing down of pseudo-membrane during intubation I have observed only in a very few cases, but this never assumed a critical form, as, after extubation, the membrane which had been pushed down, was immediately expectorated.

The imposing pseudo-membrane shown in the accompanying illustration (Fig. 1) and preserved in the hospital collection, was also a forced down croup membrane which was expectorated whole, immediately after extubation.†

Extubation was always performed by means of the cord fastened to the tube. On that account I have had very little experience in the use of the extractor. I have noticed no injurious results from leaving the cord attached to the tube. Even the smallest patients bore it well, and only in a few cases was it bitten through.

Fig. 1.



Intubated patients were usually fed without much difficulty, only, now and then, on account of great difficulty in swallowing, frequent extubation became necessary, as well as the application of nourishing enemata. The stomach tube was not employed in a single case.

*The Ermold tube with broad end was used in only a few cases.

†The patient, nine years of age, suffered from diphtheritic croup and immediately after the expectoration of the pseudomembrane was reintubated. The asphyxia ceased for 24 hours. Death took place 48 hours after intubation. On autopsy, the membrane which had been pushed down, was found reproduced, as it were, in the air passages.

Of the 100 patients cured, the time of their stay in the hospital is as follows:

In 1 case, 3 days.	{ * }	In 2 cases, 23 days.
" 1 " 5 "		" 1 case, 24 "
" 3 cases, 6 "		" 1 " 25 "
" 6 " 7 "		" 4 cases, 26 "
" 1 " 8 "		" 1 case, 27 "
" 6 " 9 "		" 2 cases, 28 "
" 6 " 10 "		" 2 " 29 "
" 2 " 11 "		" 1 case, 30 "
" 2 " 12 "		" 1 " 31 "
" 7 " 13 "		" 1 " 32 "
" 7 " 14 "		" 1 " 33 "
" 2 " 15 "		" 1 " 35 "
" 3 " 16 "		" 1 " 36 "
" 6 " 17 "		" 1 " 39 "
" 8 " 18 "		" 1 " 42 "
" 3 " 19 "		" 1 " 56 "
In 3 cases, 20 days.		" 1 " 57 "
" 6 " 21 "		" 1 " 65 "
" 2 " 22 "		" 1 " 86 "

These 100 cured cases took in all, 1918 days of hospital nursing, so that 19 days, on an average, were devoted to each patient.

The percentage of cures was the most favorable in April, 1892 (of 18 cases, 12 recovered), the most unfavorable, in November, 1891 (of 17 cases, only 2 recovered).

On the 191 fatal cases of intubation, death took place after treatment, as follows:

On the 1st day, in 48 cases.	On the 14th day, in 48 cases.
" " 2nd " " 57 "	" " 15th " " 2 cases.
" " 3rd " " 23 "	" " 16th " " 1 case. }
" " 4th " " 20 "	" " 17th " " 1 "
" " 5th " " 10 "	" " 18th " " 1 "
" " 6th " " 5 "	" " 21st " " 1 "
" " 7th " " 4 "	" " 22nd " " 1 " +
" " 9th " " 4 "	" " 23rd " " 2 cases
" " 10th " " 2 "	" " 25th " " 2 "
" " 11th " " 1 case.	" " 32nd " " 1 case.
" " 12th " " 1 "	" " 36th " " 1 "
" " 13th " " 2 cases.	

*In these cases, final extubation was accomplished quite early and the patients were subsequently under further observation at home.

+In these cases, the cause of death was, for the most part, diffuse, catarrhal pneumonia.

An autopsy was performed on 46 of these 191 fatal cases; the post mortem examination was made on those cases in which death took place after the 4th day of hospital treatment. Decubitus was found in the usual places in 21 cases, severe extended decubitus (every time in the larynx) in 3 cases, in 4 cases perichondritis laryngealis, and in 1 case an extensive perilaryngeal abscess. Severe catarrhal pneumonia was found in 14 cases.

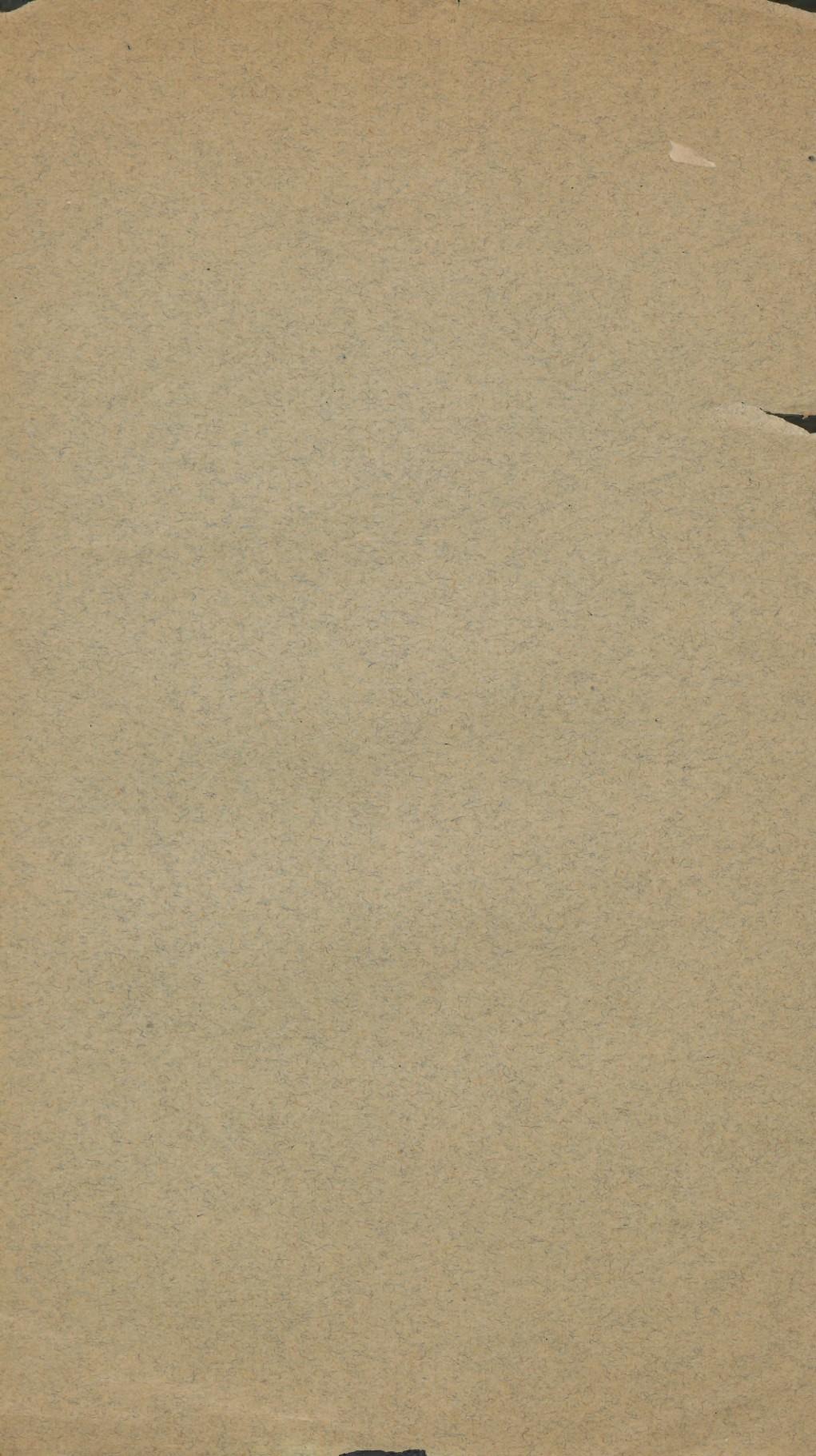
After all this, I can show, by virtue of my experience gained in 291 cases, that the O'Dwyer method is a procedure which even today could be substituted wholly for tracheotomy in the operative treatment of laryngeal croup. The operation is simple and feasible in hospital practice, the nursing of the intubated patient offers much less trouble than that of the tracheotomized patient. While the two nurses appointed for a ward could not care for more than 4 or 5 tracheotomized patients, 12 of those who were intubated could receive very careful attention. In regard to the nursing of tracheotomized and intubated patients, the experienced attendant of the City Hospital in Boston very pertinently remarked: "The time we used to spend in taking care of the tracheal tube is now occupied in feeding the children, but on the whole it is less work and more agreeable to take care of intubations."*

On the ground of the data which I have cited, I am determined to perform intubation, systematically, in future, in the hospital under my charge and to permit primary tracheotomy only in 2 cases: (1) Where beside the existing laryngo-stenosis, a high degree of pharyngo-stenosis is also present; (2) where, on account of severe oedema of the *aditus laryngis*, no success can be expected from intubation.

The present report embraces only those cases which occurred in the hospital ward. In private practice, I often had the opportunity, of course, to practice intubation, but the patient was ordered to the hospital immediately after the operation. I had only 6 cases in which the after treatment was conducted at home. Of these 6 cases, 3 recovered. Frankly speaking, I am strongly opposed to conducting the after treatment at home, as in most cases constant trained attendance is very difficult to obtain.

Budapest, August 22, 1892.

*J. B. Ball, Intubation of the Larynx, London, 1891.



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